

REMARKS

Claims 1-23 were pending at the time of examination. No claims have been amended, added, or deleted. The applicant respectfully requests reconsideration based on the foregoing amendments and these remarks.

Claim Rejections – 35 U.S.C. § 103

Claims 1-23 were rejected under 35 U.S.C § 103(a) as being unpatentable over U.S. Patent No. 6,633,923 to Kukura et al. (hereinafter "Kukura") in view of "Reconsidering Fragmentation and Reassembly," Chandranmenon and Varghese published on June 1998, Proceedings of the seventeenth annual ACM symposium on Principles of distributed computing (hereinafter "Chandranmenon"). The applicants respectfully traverse these rejections.

The claimed invention relates to techniques for transmission of messages from a first Object Request Broker (ORB) to a second, common ORB operating in a distributed object-oriented computing environment. The techniques provide a mechanism for generating and transmitting message fragments (or sub-messages) from an original message in accordance with one aspect of the invention. In one embodiment, a fragment-offset is provided. The fragment-offset, among other things, can be used to determine the location of data bytes in the message fragments (or sub-messages) with respect to the original message. It should also be noted that the fragment-offset can be updated to indicate the current offset with respect to the original message when a sub-message is constructed (Specification, page 10, lines 3-9).

Unlike conventional techniques, a significant amount of computations or bookkeeping (e.g., number of fragments constructed, total number of bytes constructed, etc.) is not required to construct message fragments. As will also appreciated, sub-messages can have header that vary in size. Similarly, the data portions of the sub-messages can vary in size. As a result, the techniques provides an elegant mechanism to determine the location of bytes in sub-messages for various messages that are constructed and transmitted between Object Request Brokers in a distributed object-oriented computing environments (Specification, page 10, lines 9-17).

Claim 1 pertains to a method of sending a message from a first common Object Request Broker to a second common Object Request Broker operating in a distributed object oriented environment. As such, claim 1 recites:

determining whether the message which is to be sent from a first common Object Request Broker to a second common Object Request Broker should be fragmented into two or more sub-messages;

initiating construction of a sub-message which is to be sent from a first common Object Request Broker to a second common Object Request Broker when said determining determines that said message is to be sent in two or more sub-messages;

initializing an offset-variable for said message to zero when said determining determines that said message is to be fragmented into two or more sub-messages;

determining whether there is a need to know the position of a byte of the sub-message with respect to the message;

reading the offset-variable for said message when said determining determines that there is a need to know the position of a byte of the sub-message with respect to the message;

completing construction of the sub-message based on the offset-variable for said message;

updating the offset-variable for said message; and

sending a constructed sub-message, which has been constructed based on the offset-variable, from the first common Object Request Broker to a second common Object Request Broker.

In the Office Action (page 4), the Examiner admits that Kukura is silent about five out of the eight steps recited in claim 1 (that is, the steps of initializing an offset, determining whether there is a need to know the position of a byte of the sub-message with respect to the message, reading the offset variable, completing construction of the sub-message based on the offset-variable, and updating the offset-variable), and relies on Chandranmenon for overcoming these deficiencies. Initially, the applicants respectfully submit that Chandranmenon cannot possibly overcome these serious deficiencies of Kukura. Accordingly, it is respectfully submitted that the Examiner has not made a *prima facie* case of obviousness.

Moreover, it is respectfully submitted that Kukura does not pertain to a method for sending a message from a first common ORB to a second common ORB operating in a distributed object oriented environment, as set forth in claim 1. Instead, Kukura pertains to dynamic configuration of interceptors (Kukura, title). The interceptors are used for a binding process. A binding is the set of interceptors involved in communication between a particular client and a particular object or set of objects. Different interceptor and binding interfaces are involved in the client and server roles that make up an invocation (Kukura, col. 13, 16-20). In CORBA, the binding process is initiated by a client application attempting to make an invocation

using an object reference to which no appropriate binding already exists. The target object reference identifies the server application with which a binding will be established. The binding that is established represents the negotiated protocol and services that allow the client to make invocations on the target object, and any shared state required by the protocol and services at the client and server (Kukura, col. 5, 38-46).

Chandranmenon describes a method for fragmenting and reassembling data packets. More specifically, the method described in Chandranmenon has the benefits of allowing reassembly to be done at any point in a network, reducing the degradation in performance caused when fragments are lost, and providing a reassembly algorithm based on an expected optimization that can process a fragment in 34 instructions.

Turning now to the specific limitations of claim 1, the Examiner alleges that Chandranmenon on page 21, column 2, discloses initializing an offset-variable for said message to zero when said determining determines that said message is to be fragmented into two or more sub-messages. The applicants respectfully disagree. It should be noted that the claimed invention does not merely recite initializing any offset-variable at any time. A general teaching or suggestion in the art that an offset-variable is generally known is thus not sufficient to establish a *prima facie* basis for rejection. The claimed invention recites an offset-variable for a message that is sent from one ORB to another ORB. In addition, it should be noted that the offset-variable is provided when the message is fragmented into two or more sub-messages. It is respectfully submitted that contrary to the Examiner's assertion, the cited section of Chandramenon does NOT teach initializing an offset variable (for a message that is to be sent by an ORB to another ORB) when it is determined that a message is to be fragmented into two or more sub-messages. It merely teaches that each fragment of an IP packet carries an offset field indicating where the fragment starts in the original packet, and a fragment length. No single offset variable for the original message, or initialization of such a variable, as required by claim 1, is mentioned in Chandranmenon. Accordingly, it is respectfully submitted that the rejection is improper for at least this reason and should be withdrawn.

The Examiner further alleges that Chandranmenon shows determining whether there is a need to know the position of a byte of the sub-message with respect to the message. Again, the applicants respectfully disagree. No such determination is shown in the cited sections of Chandranmenon. However, the applicants do realize that Chandranmenon implicitly may disclose this step, as it will be necessary in most cases to know the position of a byte of a

fragment with respect to its original message, in order to be able to properly reassemble the original message at its final destination or at an intermediary node.

Claim 1 further requires reading the offset-variable for said message when said determining determines that there is a need to know the position of a byte of the sub-message with respect to the message. The Examiner alleges that this is shown in FIG. 8, page 28 of Chandranmenon. The applicants respectfully disagree. As was discussed above, Chandranmenon does not disclose an offset-variable, as claimed, for a message that is to be sent from a first common ORB to a second common ORB. Thus, no reading of such a variable can occur in Chandranmenon. The variable that is read in Chandranmenon is a local offset variable that is contained in a fragment. Furthermore, the local variable is read as part of an optimized reassembly procedure (Chandranmenon, Figure 8 caption), which occurs after the fragment has arrived at the recipient of the message, whereas claim 1 is directed to sending a message from a first common ORB to a second common ORB, and does not address any operations that occur after the message has been received at the second ORB. Accordingly, it is respectfully submitted that the rejection is improper for at least this reason and should be withdrawn.

The Examiner further alleges that Chandranmenon discloses the steps of completing construction of the sub-message based on the offset-variable for said message, and updating the offset-variable for said message. Both of these steps require the use of the offset-variable and are thus not anticipated or rendered obvious by Chandranmenon, for at least the reasons that have been discussed in detail above.

In order to establish a *prima facie* case of obviousness, the Examiner must show that three basic criteria are fulfilled. First, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations.

With respect to the suggestion or motivation, the Examiner states that the motivation would have been "to have a orb with messages fragmentation capability into sub-messages using GIOP based standard inter-orb protocol to improve throughput in a distributed environment." However, the Examiner has neither provided any indication of where in the references such a motivation can be found, nor why a desire to have an ORB with message fragmentation capability would prompt a person skilled in the art to look at a packet fragmentation method for

TCP packets, such as the one described in Chandanmenon. Thus the Examiner has failed to show a suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings.

With respect to the reasonable expectation of success, the applicants respectfully submit that since the influential paper by Kent and Mogul, cited in Chandanmenon, advocated avoiding fragmentation and reassembly altogether due to inefficient resource usage, unstable performance, and inefficient implementation, it would not have been reasonable to expect that fragmentation would "improve throughput in a distributed environment," as stated by the Examiner. Chandanmenon states in the Abstract that "experiments over a two hop path show an improvement of 42% (in TCP throughput) using hop by hop reassembly across a 1500 byte link." However, there are no indications in Chandanmenon that this improvement would prevail for ORB-to-ORB messages in a distributed environment where a higher number of hops and links of varying capacity are involved. Thus, the Examiner has failed to show a reasonable expectation of success.

Most importantly, with respect to the prior art references teaching or suggesting all the claim limitations, it should be clear from the above discussion that the cited prior art fails to teach at least any element of claim 1 that includes the offset-variable for the message that is to be sent between the two common ORBs. Thus, the Examiner has also failed to show that all the claim limitations exist in the prior art. For at least these reasons, the rejection of claim 1 is unsupported by the art and should be withdrawn.

Independent claims 9, 13, 17 and 22 were rejected for the same reasons as claim 1. Therefore, for reasons substantially similar to those set forth above for claim 1, the applicants respectfully contend that the rejection of independent claims 9, 13, 17 and 22 is unsupported by the cited art and should be withdrawn.

Dependent claims 2-8, 10-12, 14-16, and 23 depend from independent claims 9, 13, 17 and 22, respectively and are therefore allowable for at least the same reasons that were discussed above with respect to these claims.

Conclusion

The applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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